

Work Order ID 84380

May-30-12 8:00:39 AM

84380

Page 1

Item ID: D350-748-101

Accept

N900040100

Setup

Start

NS1

Revision ID: U/R

Stop

NS2

Item Name: Crosstube Installation, High Fwd

Start Date: 5/10/12 Start Qty: 1.00 *1*

Cust Item ID:

Required Date: 5/25/12 Req'd Qty: 1.00 *1*

Customer:

Reference:

Approvals:

Process Plan:

V

Date:

QC:

Tooling:

Date:

Date:

Run

Start

NR1

Stop

NR2

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Draw Nbr	Revision Nbr	<i>F U/R OK QP 12/11/12</i>	<i>d</i>	0.00					<i>MWJ 12/06/12</i>
----------	--------------	-----------------------------	----------	------	--	--	--	--	---------------------

100 *100*

DC

Document Control

Memo

Photocopy bluefile & type labels per PPPID350-748-101

CHG002

110

110

CNC Bend 1

CNC Delta 100 Bender

BENDING MACHINE - CROSSTUBES

0.00

Memo

Bend tube as per Dwg D350-748-141 using CNC bender program D350F and Folio FT

120

120

QC

Quality Control

QC15- Crosstube Dimensional Check

0.00

Memo

Issue P/O to Metcar

12-5-11

P/O: 16954

CD 12/06/09

12-5-11

Work Order ID 84380

Thursday, May 10, 2012 4:26:52 PM

84380

Page 2

Item ID: D350-748-101

Accept

N900040100

Setup Start

NS1

Revision ID: U/R

Item Name: Crosstube Installation, High Fwd

Stop

NS2

Start Date: 5/10/2012 **Start Qty:** 1.00 ***1***

Cust Item ID:

Required Date: 5/25/2012 **Req'd Qty:** 1.00 ***1***

Customer:

Reference:

Approvals: Process Plan:

Date:

Tooling:

Date:

Run Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2

**Sequence ID/
Work Center ID**

**Operation
Description**

**Set Up/
Run Hours**

Tool ID

Tool #

**Plan
Code**

**Accept
Qty**

**Reject
Qty**

**Reject
Number**

**Insp.
Stamp**

125

125

HandFXtube

Hand Finishing Crosstubes

Memo

Stress relief

Heat treat crosstube as per QSI010 4.3

Temp:

Start time:

Finish time:

0.00

0.00

N/A

127

127

QC

Quality Control

QC6- Inspect dimensions to drawing

0.00

Memo

0.00

5/7/2016

POSITIVE RECALL

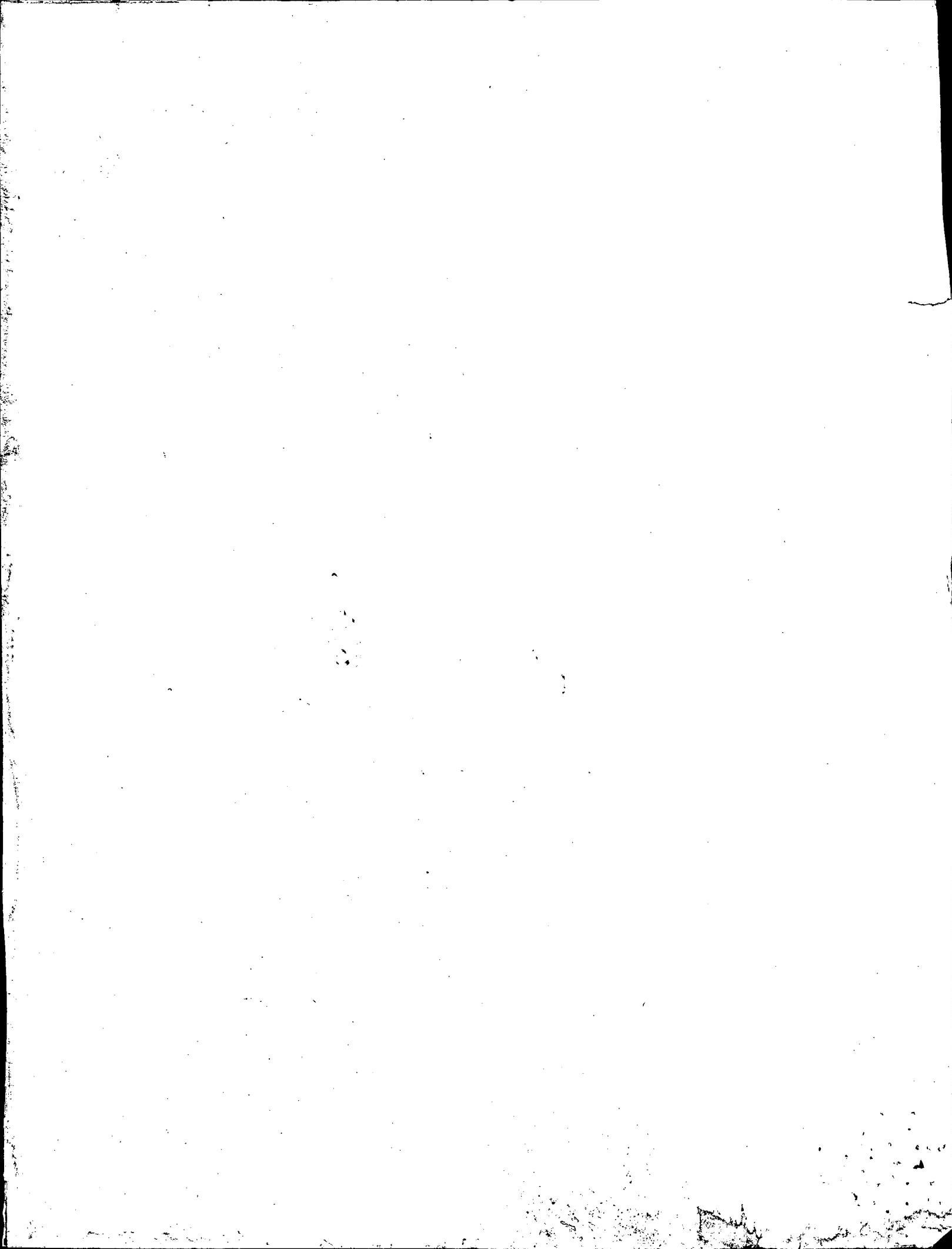
EFFECTIVE 12/05/11 AUTH P

RELEASED 10/10/11 DATE 12/6/18

FOR NARROW WIDTH

SEAL BROKEN
NCR

PTO



W/O: 84380

WORK ORDER CHANGES

DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D350.748-101 PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
12.05.11	110	The is too narrow after bending	GP 12.05.11 Q51042	Stress relieve. Check width.	JL 12-5-17	JL 12-5-17	GP 12.05.11 Q51042	S Rheo

NOTE: Date & initial all entries

W. H. Gossamer. Quetek

22

W. H. Gossamer.

WO: 84380

WORK ORDER CHANGES

DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D350-748-101 PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
12-05-17	110	Tube is bent high	GP 12-05-17 051042	Cut to 23.40" Acceptable	MW 12-6-17	TH 12-6-17	GP 12-05-17 051042	5/6/20

NOTE: Date & initial all entries

comes at the
end of the

first

line

Work Order ID 84380

84380

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May-30-12 8:00:39 AM

Item ID: D350-748-101

Accept

N900040100

Setup Start

NS1

Revision ID: U/R

Stop

NS2

Item Name: Crosstube Installation, High Fwd

Start Date: 5/10/12 Start Qty: 1.00

1

Cust Item ID:

Required Date: 5/25/12 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

130

130

Crosstubes

0.00

Crosstubes

Memo

0.00

1-Drill Tube as per Dwg D350-748-141 Using DT8876 A,B &C Drill Jigs,
Set-up drill table as per QSI 010

MO/RM

12-5-23

2-Deburr

3-Engrave Part # and Batch # as per Dwg D350-748-141

4-Remove all marks from tube within limits of D350-748-141

5- Apply a light coat of LPS3 on the interior of tube

Batch: A145

SJW

12-5-24

140

QC5- Inspect part completeness to step on W/O

0.00

140

QC

Quality Control

Memo

0.00 5/20/13

CHECK 10 DEG HOLES WITH DT8876E (EUROCOPTER CLAMP)

Work Order ID 84380

Thursday, May 10, 2012 4:26:52 PM

84380

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Item ID: D350-748-101

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N900040100

Setup

Start

NS1

Revision ID: U/R

Item Name: Crosstube Installation, High Fwd

Stop

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Start Date: 5/10/2012 **Start Qty:** 1.00 ***1***

Cust Item ID:

Required Date: 5/25/2012 **Req'd Qty:** 1.00 ***1***

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Approvals: Process Plan:

Date:

Tooling:

Date:

Run

Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2

**Sequence ID/
Work Center ID**

**Operation
Description**

**Set Up/
Run Hours**

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

150

150

Outsource3

Outsource process - Cad plate

Memo

Issue P/O: 17084

Stress relief at 375° for 5 hours

Magnetic Particle Inspect per ASTM E1444

Cadmium Plate per AMS-QQ-P-416B, Class 1, Type 2

Embrittle relief at 375° for 8 hours, Chromate Treat

Possible Supplier: Southwest United Industries

Ensure Certificate of Conformity is attached

160

Receive & Inspect for Damage & Mat'l Certs

0.00

160

Packaging

Packaging

Memo

0.00

Ensure certificate of conformity is attached

170

QC5- Inspect part completeness to step on W/O

0.00

170

QC

Quality Control

Memo

0.00

NDT

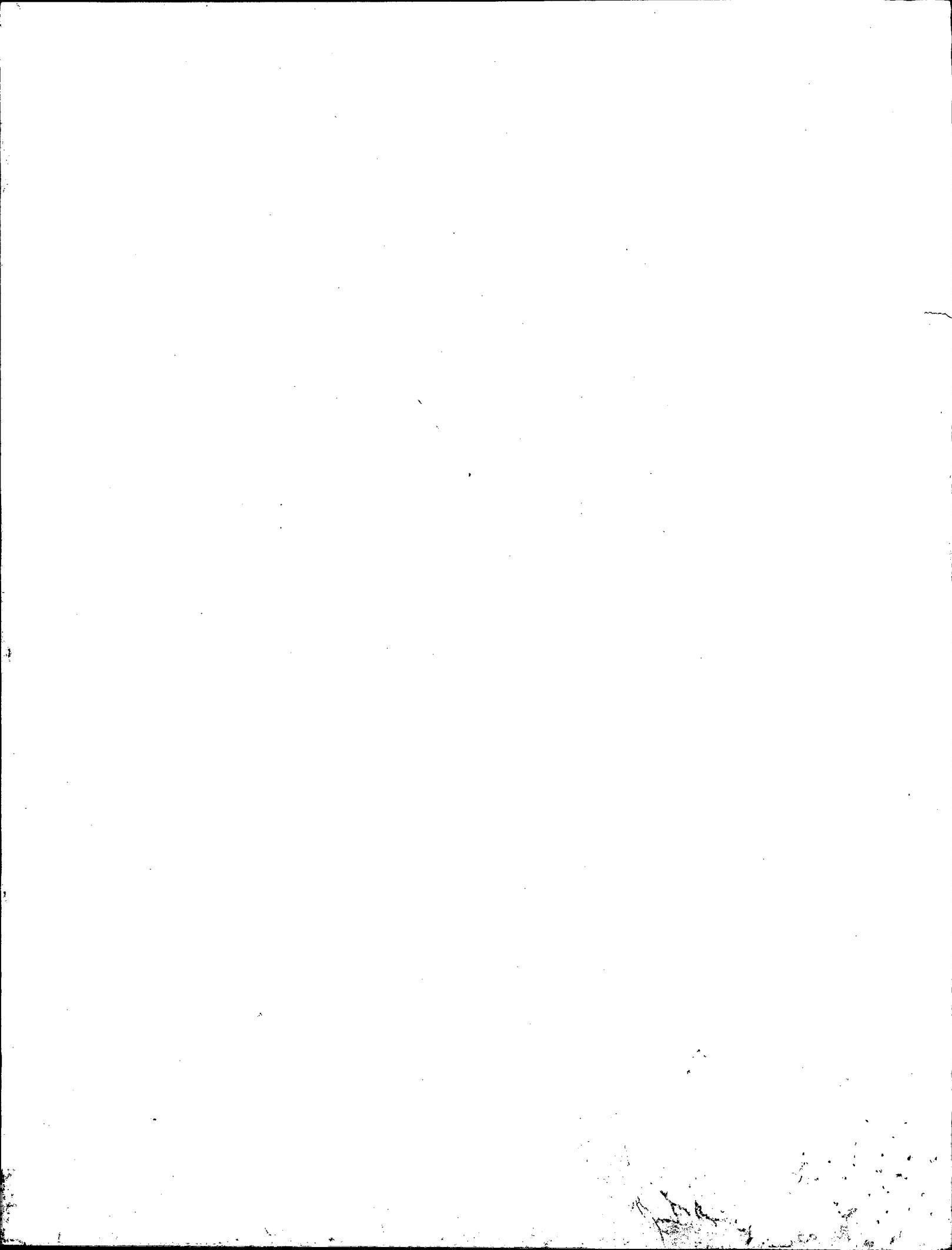
Acc'd.

P10:17258

CL 12/06/19 ①

SP
12-5-15

14
Puffo/S
Puffo/S



Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	
11.10.05	161	LOAD TUBE TO 3500 ^{lb} FOR 1 MINUTE. REF D.S. EMBIL.	CP	12/6/18	1	GP	12/6/18	
11.10.05	162	NDT TUBE.						

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Chris Provencal

From: David Shepherd <dshepherd@dartaero.com>
Sent: Tuesday, April 27, 2010 3:40 PM
To: 'Mike Petsche'
Cc: 'Bill Beckett'; 'L Lacelle'; 'Chris Provencal'; 'Dan Stow'; ssheldon@dartaero.com
Subject: 350 crosstubes

Mike,

I discussed the 350 crosstube load testing with Bill a little while ago and this plan makes sense to him.

So, my recommendation to clear these crosstubes is to load the fwd crosstubes to 3500 lb and the aft crosstubes to 3000 lb in the deflection test rig and document on the work orders that this test has been completed. Hold max load for 1 minute. Per TP-D350-748-2, these loads represent the maximum load on these crosstubes at gross weight and are below the yield point of the material. I would like to request that Chris Provencal witness these tests and sign off the work orders based on his experience with Dart landing gears. My feeling is that if there is a problem with the parts, it will manifest itself during this load test. I, for one, would feel a lot more confident in testing each crosstube in this manner than relying totally on what Exova has to say. I think it would be very difficult to reach a conclusion on the whole batch on the basis of cracks in two parts from the batch.

I believe that we can accomplish this before next Friday, which also gives us time to hear what Exova has to say in case it has an impact on our decision. So far, what I have seen from Exova shows me that there are fluctuations in the heat treating but the tubes are heat treated to our specification.

For this reason, I believe we should tell DHS that it looks like we will be able to start shipping 350 crosstubes by May 7th pending a successful Engineering test of the material.

David.

Work Order ID 84380

84.380

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May-30-12 8:00:39 AM

Item ID: D350-748-101
Revision ID: U/R
Item Name: Crosstube Installation, High Fwd
Start Date: 5/10/12 **Start Qty:** 1.0
Required Date: 5/25/12 **Req'd Qty:** 1.0

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start *NR1*
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop *NR2*

Work Order ID 84380

84380

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May-30-12 8:00:39 AM

Item ID: D350-748-101

Accept

N900040100

Setup

Start

NS1

Revision ID: U/R

Stop

NS2

Item Name: Crosstube Installation, High Fwd

Start Date: 5/10/12 Start Qty: 1.00 *1*

Cust Item ID:

Required Date: 5/25/12 Req'd Qty: 1.00 *1*

Customer:

Reference:

Approvals:	Process Plan:	Date:	Tooling:	Date:	Run	Start	*NR1*
						Stop	*NR2*
	QC:	Date:	SPC (Y/N):	Date:			

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
210 *210* QC Quality Control	QC5- Inspect part completeness to step on W/O Memo	0.00				1			12/06/24
220 *220* Packaging Packaging	Pick Kit Memo	0.00							12/06/24
230 *230* QC Quality Control	QC4- 100% Inspect kits for completeness Memo	0.00				1			12/06/25

Picklist Print

May-30-12 8:00:39 AM

Page 1

Work Order ID: 84380

Parent Item: D350-748-101

Start Date: 5/10/12

Required Date: 5/25/12

Parent Item Name: Crosstube Installation, High Fwd

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:A New Issue 06-07-05 JLM

IPP Rev:B Update qty of MS21042L5 06-09-12 KJ

VERIFY BY:DD

IPP Rev:C Rev B 07-11-15 DD

IPP Rev D Combined manufacturing 08.04.02 EC verified by: DD

IPP Rev:E 08-06-24 revD as per dwg DD verified by:EC IPP Rev:F 10.08.04 added QSI010

4.3 DD verf:EC

IPP REV:G ADD UNDER BEND COMMENT 12-05-28 JLM

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
ALS4-1032-225		Purchased	No			200	Each	819.0000	1	1		AF 12-6-22	
Insert				118520					①				
				<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>					
				ST281		796							
				108696		146							
				110768		62							
				118386		55							
				118966		68							
				121269		465							
				ST282		23							
				120410		10							
				120451		13							
AN4-41A		Purchased	No			220	Each	539.0000	8	8		04/22	
Bolt				<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>					
				360		181							
				121185		181							
				ST360		358							
				115108		3							
				115705		7							
				118451		29			8				
				118838		50							
				119328		100							
				120423		150							
				121205		15							
				121573		4							

Picklist Print

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May-30-12 8:00:39 AM

Work Order ID: 84380

Parent Item: D350-748-101

Start Date: 5/10/12

Required Date: 5/25/12

Parent Item Name: Crosstube Installation, High Fwd

Start Qty: 1.00

Required Qty: 1.00

AN4-6A
Bolt

Purchased

No

220

Each

1,514.0000

16

16

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
355	222	
121631	222	
ST356	1292	
119017	792	16
121243	500	

AN5-32A
Bolt

Purchased

No

220

Each

245.0000

4

4

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
ST339	145	
119862	50	4
120423	75	
120910	20	
ST340	100	
121541	100	

AN960JD10
Washer

NAS1149D0363J

Purchased

No

121524

200

Each

0.0000

1

1

AB 12-6-22

AN960JD416
Washer

NAS1149D0463J

Purchased

No

220

Each

30.0000

32

32

m121912

AN960JD516
Washer

NAS1149D0563J

Purchased

No

220

Each

0.0000

8

8

m19546 12/6/22

Picklist Print

Page 3

May-30-12 8:00:39 AM

Work Order ID: 84380**Parent Item:** D350-748-101**Start Date:** 5/10/12**Required Date:** 5/25/12**Parent Item Name:** Crosstube Installation, High Fwd**Start Qty:** 1.00**Required Qty:** 1.00

D2856-400	Manufactured	No	200	f	242.5445	1.181	1.2431579	AB	12-6-22
------------------	--------------	----	-----	---	----------	-------	-----------	----	---------

Abrasion Strip

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
-----------------	----------------	-----------------

ST403	216	
(81875)	216	
ST409	26.5445	
63735	0.6696	
68076	0.3149	
71164	8.46	
79551	17.1	

D3500-1	Manufactured	No	220	Each	75.0000	4	4
----------------	--------------	----	-----	------	---------	---	---

Saddle

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
-----------------	----------------	-----------------

ST423	14	
78595	14	
ST424	31	
73405	20	
73406	8	
76000	3	
ST425	30	
76940	30	

D3501-1	Manufactured	No	220	Each	367.0000	16	16
----------------	--------------	----	-----	------	----------	----	----

Bushing

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
-----------------	----------------	-----------------

ST051	367	
67757	4	
73391	6	
74866	207	
77033	61	
81955	26	
83253	63	

Picklist Print

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Work Order ID: 84380

Parent Item: D350-748-101

Parent Item Name: Crosstube Installation, High Fwd

Start Date: 5/10/12

Required Date: 5/25/12

Start Qty: 1.00

Required Qty: 1.00

D3502-1
Support

Manufactured

No

200

Each

21.0000

2

2

A8 12-6-22

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
-----------------	----------------	-----------------

ST051	21	
73419	11	
74873	10	

D350-748-141TRN

Crosstube Turning Detail

Manufactured

No

110

Each

3.0000

1

1

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
-----------------	----------------	-----------------

LG	79013	3
74718	1	
83277	1	
83278	1	

MS21042L4

Nut

Purchased

No

220

Each

4,059.0000

24

24

Jnd

12-5-11

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
-----------------	----------------	-----------------

ST300	4059	
119075	125	
121011	677	
121444	2957	
121652	300	

MS21042L5

Nut

Purchased

No

220

Each

1,447.0000

4

4

blue/220

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
-----------------	----------------	-----------------

300	500	
121652	500	
ST300	947	
108827	8	
116105	5	
116548	43	
117611	18	
119109	865	
17651	8	

Picklist Print

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Work Order ID: 84380

Parent Item: D350-748-101

Parent Item Name: Crosstube Installation, High Fwd

Start Date: 5/10/12

Required Date: 5/25/12

Start Qty: 1.00

Required Qty: 1.00

MS21920-20

Purchased

No

200

Each

86.0000

2

2

Clamp (per MIL-DTL-8783C)

AF 12-6-22

Location	Loc Qty	Loc Code
LG050	86	
116799	8	
120676	8	
(121067)	20	(2)
121274	50	

MS27039-1-10

Purchased

No

200

Each

126.0000

1

1

Screw

122027

Location	Loc Qty	Loc Code
GA	100	
120449	100	
ST291	26	
120120	26	

DART AEROSPACE LTD

Work Order: 8430

Description: Crosstube High Fwd (AS350/355)

Part Number: D350-748-101

Inspection Dwg: D350-748-141

Rev: F

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Bend

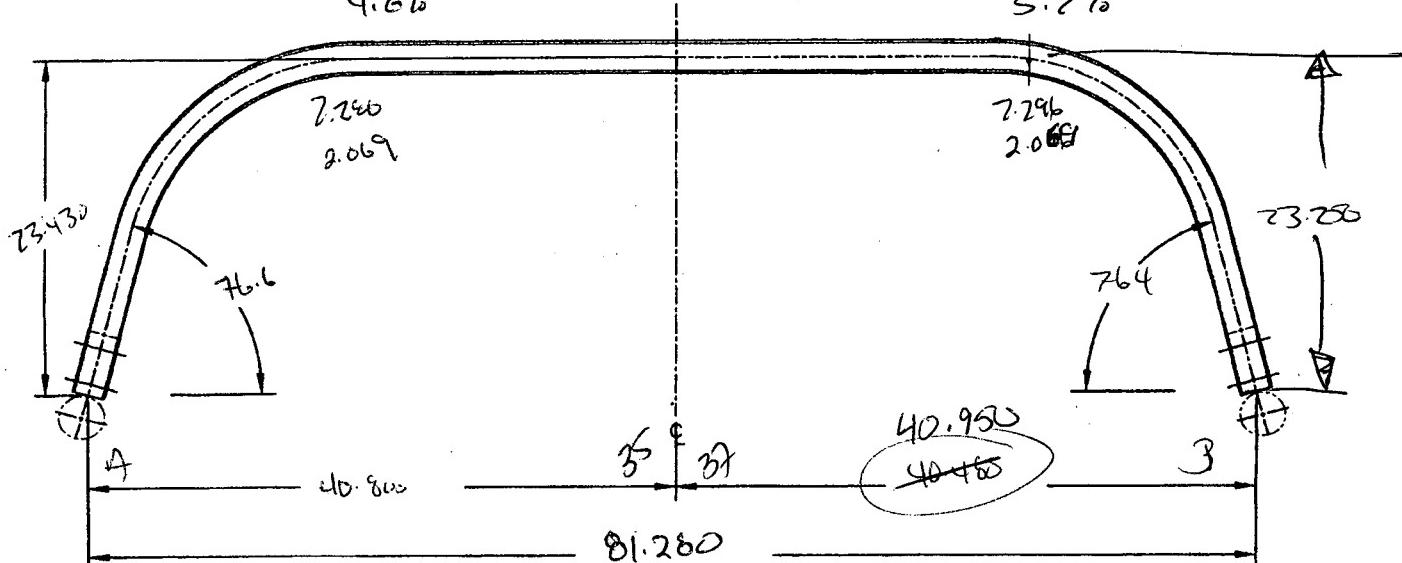
Required Dimension	Min	Max
Height	23.13	23.37
1/2 Span	40.78	41.02
Angle	75	77
Total Span	81.56	82.04

0.211 ± 4.349

4.8%

0.223 ± 4.365

5.7%



Comments

SIDE A = 4.8% crushing @ 35 Passes.
 SIDE B = 5.7% crushing @ 37 Passes
 twist = 0.054

QC15 Inspection	12.06.25
Date	

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	10.08.23	Dwg Rev updated	KJ	
C	11.11.07	Dwg Rev updated	KJ	AB

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DART AEROSPACE LTD

Work Order: 34380

Description: Crosstube High Fwd (AS350/355)

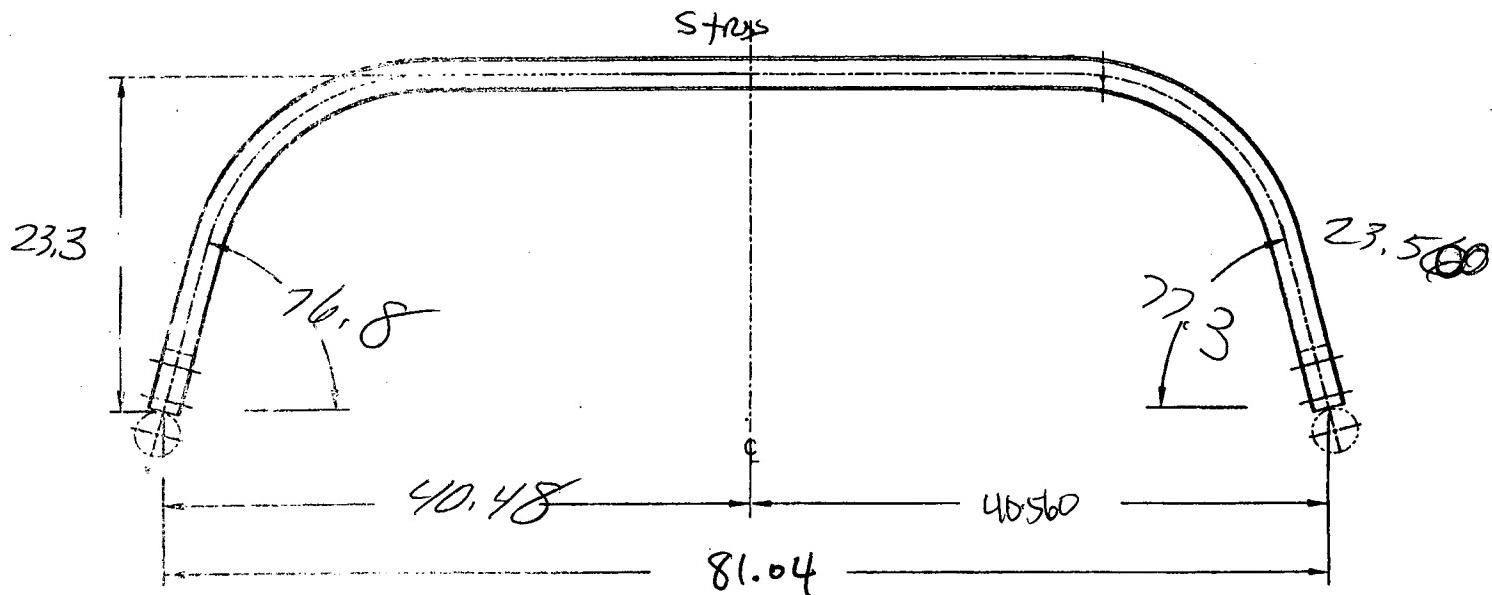
Part Number: D350-748-101

Inspection Dwg: D350-748-141

Rev: F

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Required Dimension	Min	Max
Height	23.13	23.37
1/2 Span	40.78	41.02
Angle	75	77
Total Span	81.56	82.04



Comments
TWIST 0.092
TRIM 23.50" to 23.40" Acceptable <u>9/10.05.17</u> CPS1042

QC15 Inspection	S
Date	17/06/16
QC6	

Rev	Date	Change	Revised by	Approved
A	07.02.03	New Issue	KJ/JM	
B	10.08.23	Dwg Rev updated	KJ	
C	11.11.07	Dwg Rev updated	KJ	<u>AB</u>

121 0605

2402

8 7 6 5 4 3 2 1

Item	Qty	Part Number	Description
1	X	D350-748-141	CROSSTUBE ASSEMBLY (AS 350/355 HI FWD)
2	1	D6015-125	CROSSTUBE (OR D6017-115)
3	2	D3502-1	SUPPORT
4	2	D2856-400-710	ABRASION STRIP
5	1	AELS-1032-225	INSERT
6	1	NAS1149D0363J	WASHER (OR AN960JD10)
7	2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
8	1	MS27039-1-10	SCREW

GENERAL NOTES:

- F** 1) MATERIAL: MANUFACTURED FROM D6015-125 OR D6017-115
FINISHED LENGTH = 110.270±0.06
- 2) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: DART PART NUMBER "D350-748-141" AND BATCH NUMBER ON INSIDE OF CUFF
PER DART QSI 044 6.4 (VIBRATING STYLUS)
- 7) WEIGHT: 30.45 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.297 HOLE.
- 9) BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO
BENDING IS 6% BASED ON O.D.
- 11) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING. ACCEPTABLE TO
VERIFY TENSILE STRENGTH BY HARDNESS TEST PER ASTM E18 TO 40-45 HRC.
- 12) INSTALL D2856-400-710 ABRASION STRIPS WITH A GAP ON BOTTOM SIDE OF CROSSTUBE,
CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 13) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE
OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES,
NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY.
CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE
MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO
CRACKING/CHIPPING/GROOVES.
- 14) TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT
NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.
- 15) MAX TWIST AFTER BENDING: WITH XTUBE LAYED FLAT ON SURFACE, THE DIFFERENCE BETWEEN
CUFF HEIGHTS FROM THE SURFACE MAY BE NO LARGER THAN 0.25 (ZN C1-3).

JM 380

UNDER REVIEW

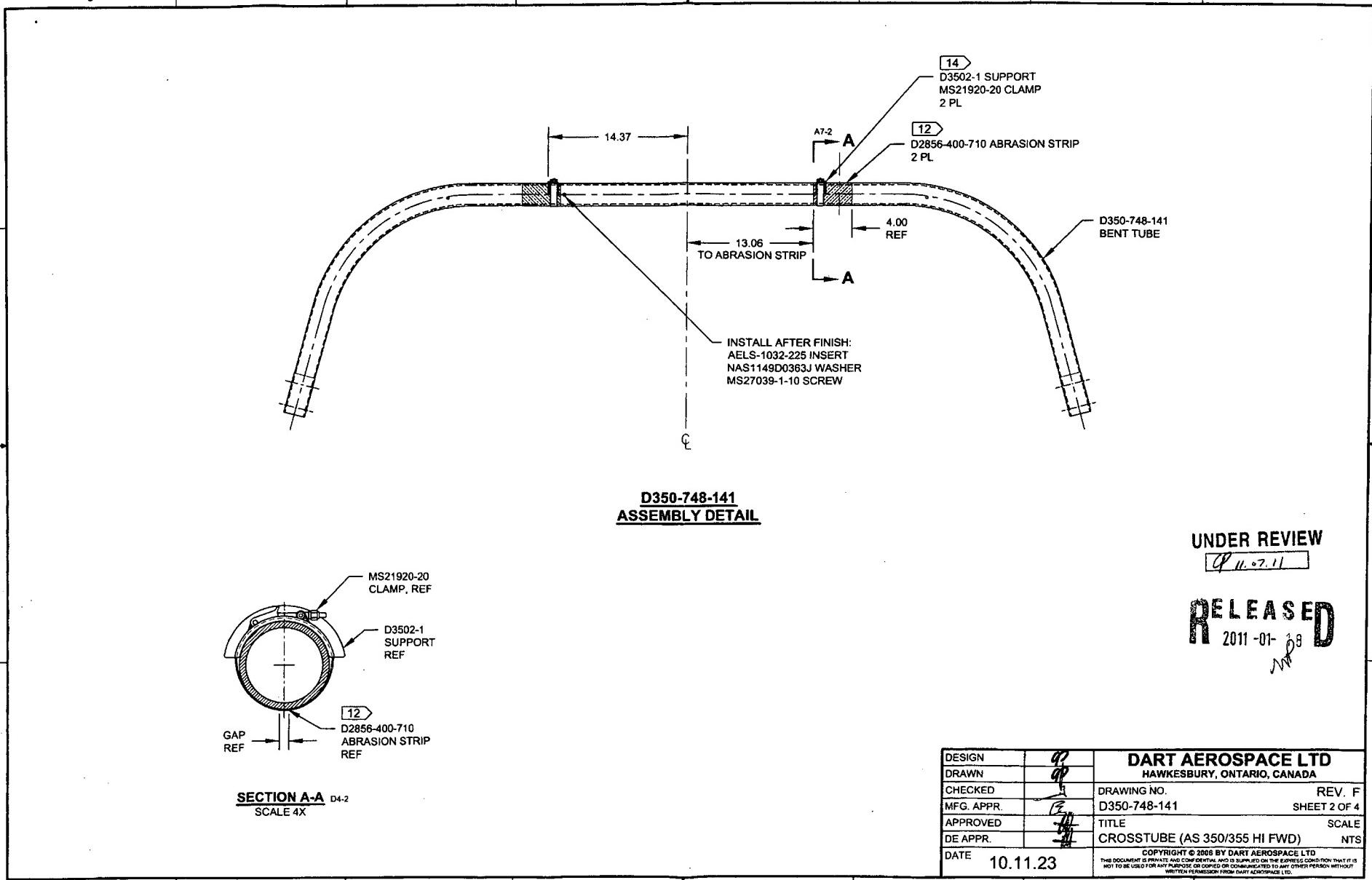
10/10/12

RELEASED
2011-01-18

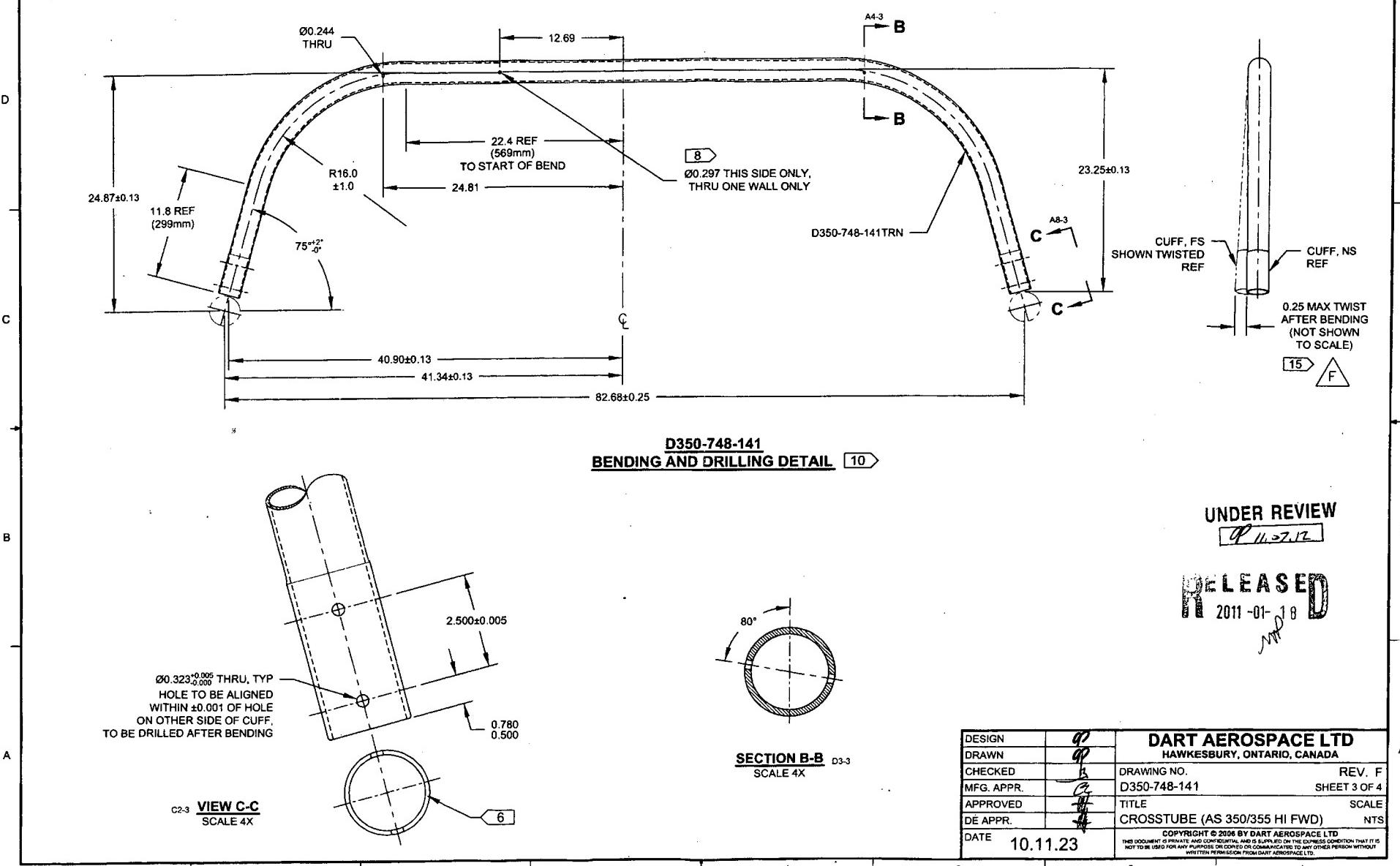
F	ADD HRC TEST OPTION (B8-1) PER PAR 09-040, ADD TWIST LIMIT (A8-1, C1-3), ADD D6015-125 OPTION (C8-1). STOCK DIM NOW MACHINED (D1-4)	CP	10.11.23
E	REVISE GENERAL NOTES; UPDATE TO CURRENT ADD STANDARDS, RELOCATED FLAG #6 PER PAR 08-046 (ZN A6-3); TOLERANCES (ZN C6-3, D1-3)	RF	09.09.30
D	MAG. PARTICLE AND CAD PLATE AS MFD.	CP	06.10.31
C	ADD CAD PLATING	CP	06.08.14
B	ADD D6017-115 & PRIME AND PAINT	CP	06.06.30
A	NEW ISSUE	CP	06.03.31
REV.	DESCRIPTION	BY	DATE
DESIGN	<i>PP</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	<i>PP</i>	DRAWING NO.	
CHECKED	<i>PP</i>	REV. F	
MFG. APPR.	<i>PP</i>	D350-748-141 SHEET 1 OF 4	
APPROVED	<i>PP</i>	TITLE	
DE APPR.	<i>PP</i>	SCALE	
DATE	10.11.23	CROSSTUBE (AS 350/355 HI FWD) NTS	

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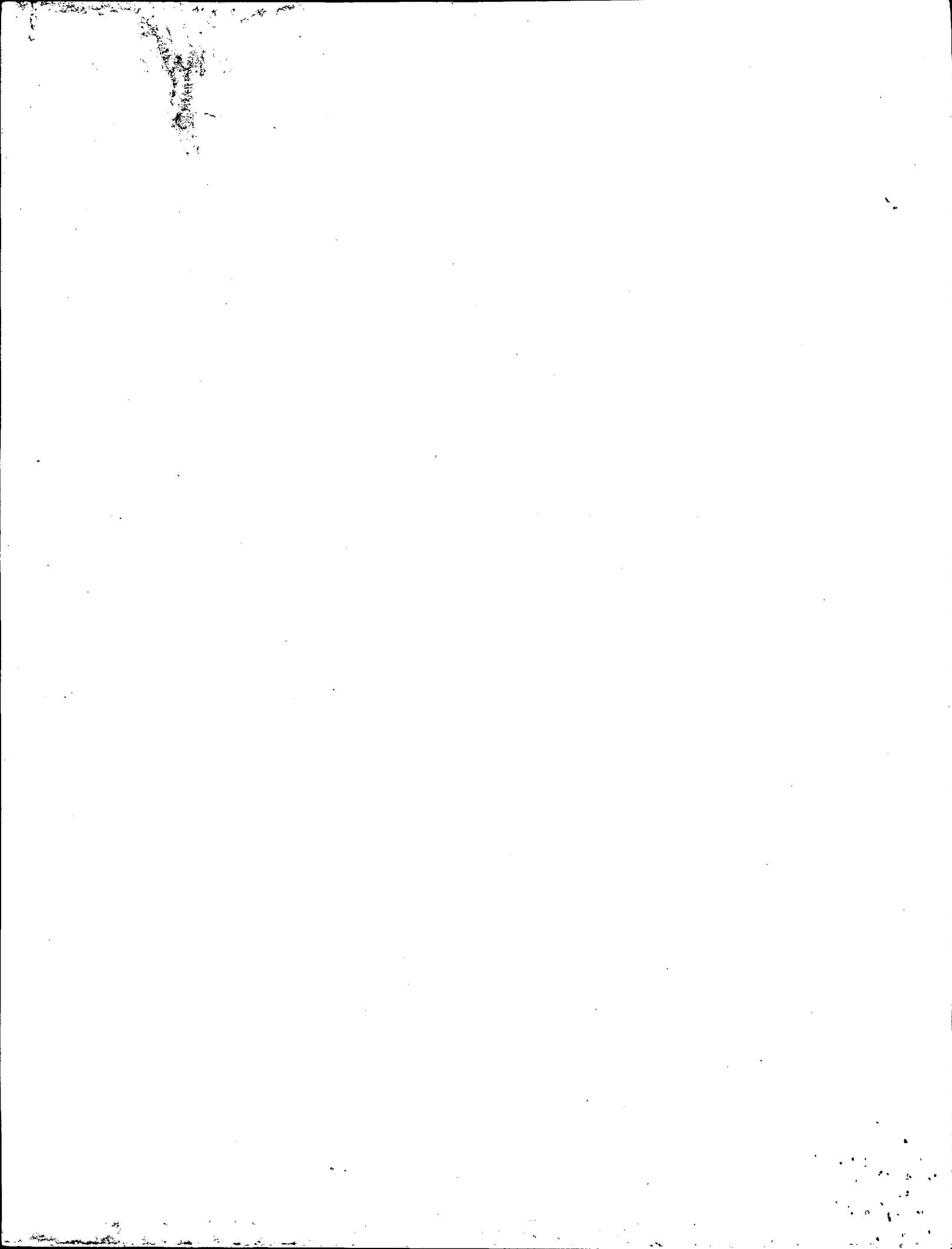
8 7 6 5 4 3 2 1



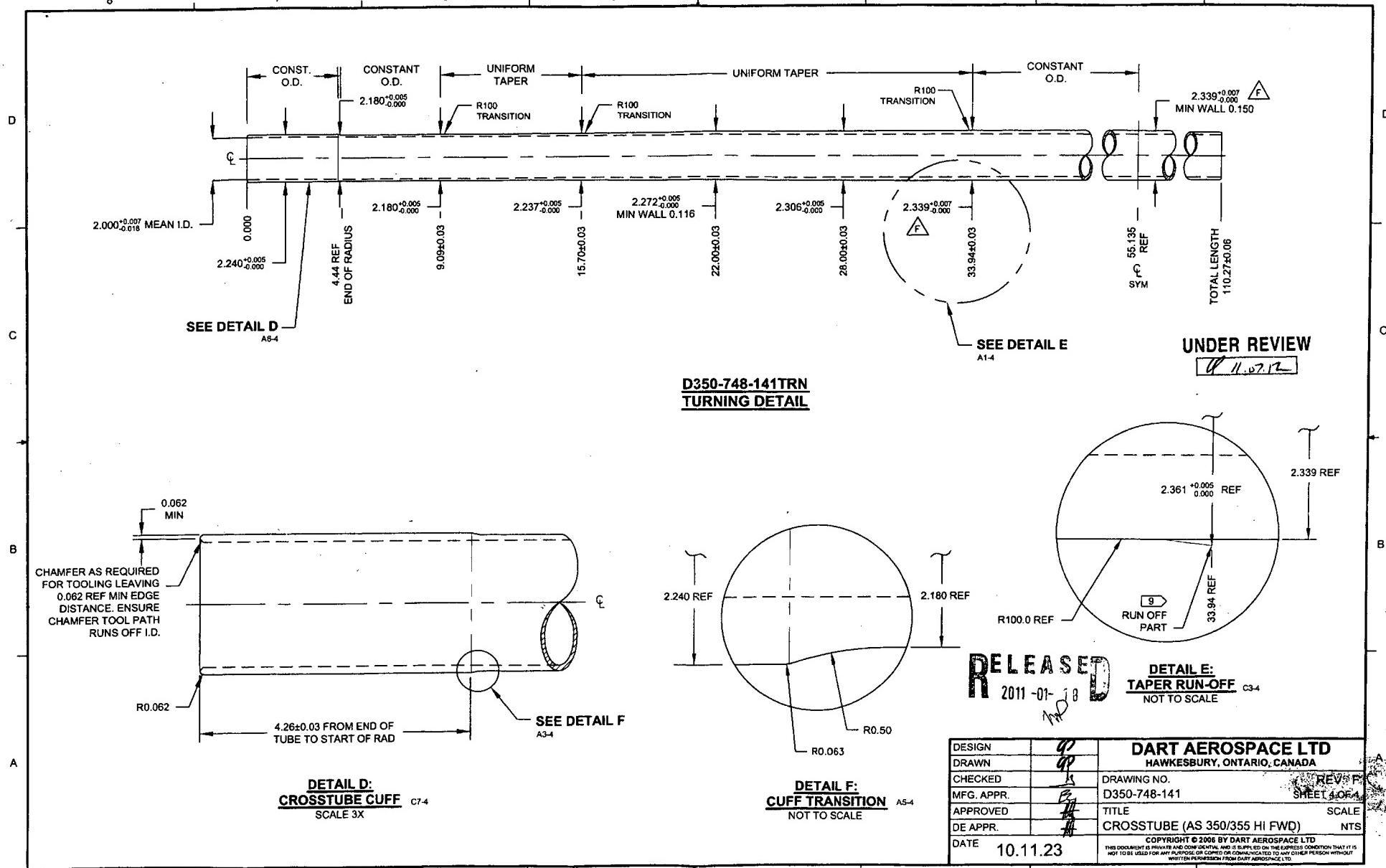
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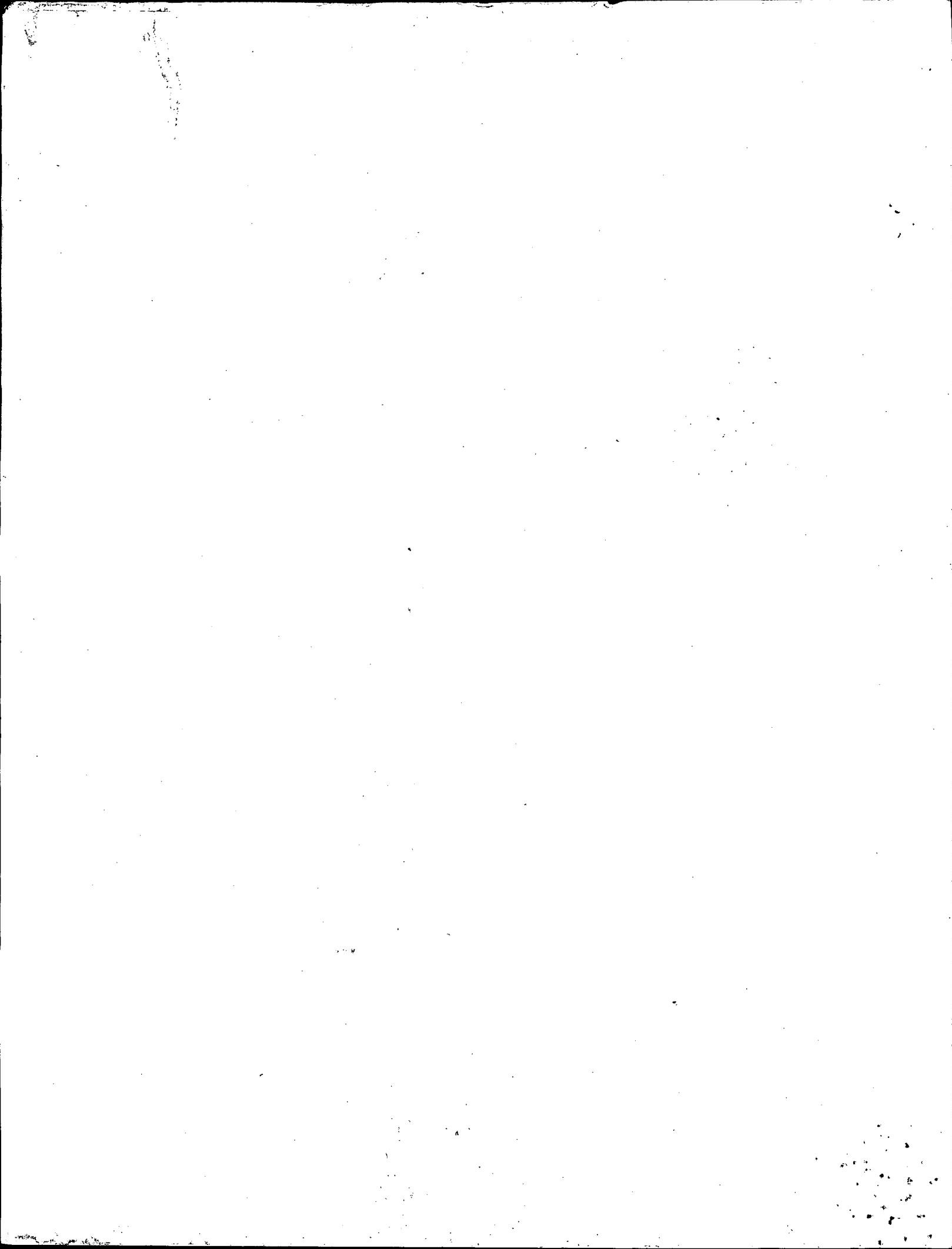


8 7 6 5 4 3 2 1



8 7 6 5 4 3 2 1







Metcor Inc.
560, boul. Arthur-Sauvé
St-Eustache (Québec) J7R 5A8
TEL : 450-473-1884

514-691-5498
514-691-6454

Certificat de Conformité
Certificate of Compliance

BON DE TRAVAIL order	CHARGEMENT load
175926	1

CLIENT / customer 215

DART AEROSPACE
1270 ABERDEEN
HAWKESBURY

ON K6A 1K7

LIVRÉ À / shipped to:

DART AEROSPACE
1270 ABERDEEN
HAWKESBURY

ON K6A 1K7

COMMANDE DU CLIENT customer po	BON DE LIVRAISON DU CLIENT customer shipper no.	MATÉRIEL material	CODE DE TRAITEMENT mat'l heat code	NUMÉRO DE LOT lot number
16854		Steel		

SPÉCIFICATIONS DU PROCÉDÉ

processing specifications

STRESS REL

SAE AMS 2759/1 REV.E

EXIGENCE / requirement SPÉCIFICATIONS / specified TESTS EXÉCUTÉS / performed RÉSULTATS DE TESTS / results

Visual

QUANTITÉ quantity	POIDS weight	DESCRIPTION DES PIÈCES parts description
7	210	<p>D350-748-101 (1) CROSS TUBE</p> <p>(1) D350-748-101 CROSS TUBE</p> <p>CONTENANT: 1 PALETTE</p>

COMMENTAIRES / comments



Metcor Inc.
560, boul. Arthur-Sauvé
St-Eustache (Québec) J7R 5A8
Tél.: 450 491-1888
Télécopieur: 450 491-5493
Courriel: info@metcor.ca
Site Web: www.metcor.ca

Certificat de Conformité
Certificate of Compliance

BON DE TRAVAIL order	CHARGEMENT load
175926	1

CLIENT / customer 215

DART AEROSPACE
1270 ABERDEEN
HAWKESBURY ON K6A 1K7

LIVRÉ À / shipped to:

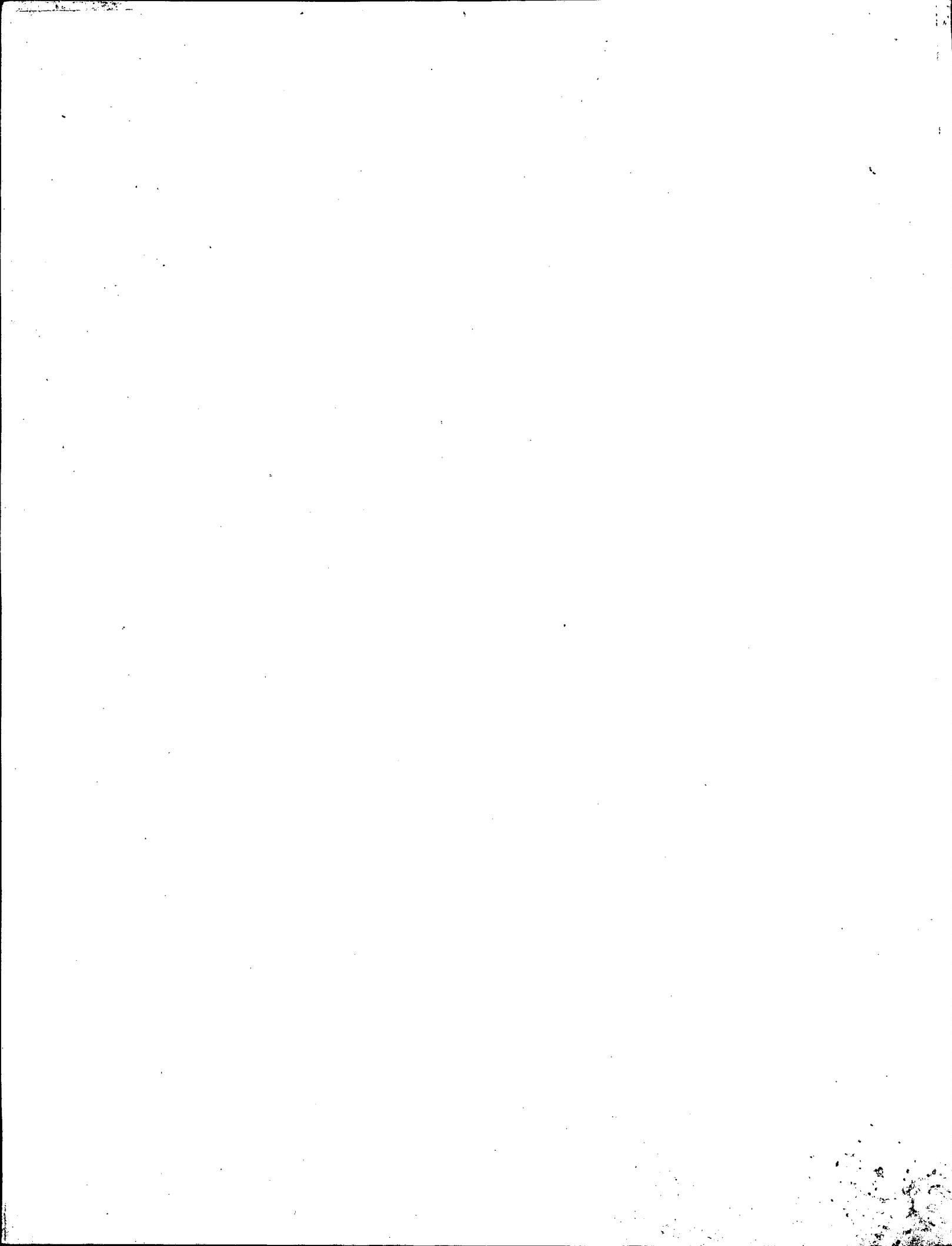
DART AEROSPACE
1270 ABERDEEN
HAWKESBURY ON K6A 1K7

1

COMINCIATAIRES / COMMENTS

INSPECTEUR / inspector:

DATE: 2012-05-14



**CERTIFICATE OF
CONFORMANCE**

**CADORATH PLATING CO. LTD.
2150 LOGAN AVENUE
WINNIPEG, MANITOBA R2J-0J1**

DATE: Jun-12-2012

CONSIGNMENT TO: Dart Aerospace Ltd.
1270 Aberdeen St.
Hawsbury, ON K6A 1K7

W/O #: 114971
INVOICE #: 60875

**CONTRACT OR
PURCHASE ORDER #** PO17084

DESCRIPTION: CROSSTUBE **QTY** 1

P/N # d350-748-101 **S/N #** 84380

STRESS RELIEVE HEAT CHART # 12-546. MPI-IAW ASTM-E1444.
CADMIUM PLATE IAW AMS-QQP-416C TYPE 2 YELLOW CLASS.
BAKE HEAT CHART # 12-573. MPI IAW ASTM-E1444.

CERTIFICATE: I certify that the items indicated hereon have been inspected and tested and conform to all specifications and requirements detailed on the contract or purchase order.

Approved Inspector:

CAI
08

LIQUID PENETRANT TEST REPORT

ACUREN

CLIENT
ATTENTION
ADDRESSPROJECT
ITEM(S) EXAMINEDDST Aerospace
MATT/LINDA
1270 ABERDEEN ST.
HAWKESBURY, ONTDATE
ACUREN JOB NO.
PO/WO NO.
WORK LOCATION
ACCEPTANCE STD.June 19/2012 TIME AM PM
100-12-02651084 —
SME

ASTM 1417/AS1038 REV./DATE 2005

F.P.I. on cross tubes

(10) Pcs

SEE RESULTS

JOB DESCRIPTION PROCEDURE NO. LT 002 REV./DATE 2008 TECHNIQUE NO. LT Tech 2 REV./DATE 2008

PART NO. SEE RESULTS MATERIAL 4130 STEEL THICKNESS VARIOUS
SCOPE A DRY FLUORESCENT LIQUID PENETRANT EXPLANATIONTEST DETAILS FLUORESCENT VISIBLE WATER WASH SOLVENT REMOVABLE POST EMULSION
METHOD MAGNAFLUX BLACK LIGHT S/N 16459 OUTPUT > 1000 μW/cm² AMBIENT < 2 °C
FAMILIAR BRAND ZL607 MINIMUM DWELL TIME 45:10 MIN. LIGHTING EQUIP. FLASHLIGHT TROUBLELIGHT OUTPUT > 100 fc @ SURFACE
PENETRANT H₂O MINIMUM DRY TIME >10 MIN. OTHER LABNO
PENETRANT REMOVER H₂O MINIMUM DWELL TIME 10 MIN. LIGHT METER S/N 1098866 CAL DUE DATE
DEVELOPER SKD 52 DEVELOPER TYPE NON AQUEOUS AQUEOUS DRY JULY 2012TEST SURFACE AS WELDED MACHINED SHOT BLASTED CLEAN BARE METAL
SURFACE CONDITION AS GROUND -4°C/20°F TO 10°C/50°F 10°C/50°F TO 52°C/125°F > 52°C/125°F
SURFACE TEMPERATURE < -4°C/20°F

RESULTS- METRIC IMPERIAL

W.O.#s - CROSS TUBES.

1 - " " 83701 ✓

1 - " " 83699 ✓

1 - " " 83698 ✓

1 - " " 81517 ✓

1 - " " 81519 ✓

1 - " " 84380 ✓

1 - " " ✓

1 - " " ✓

1 - " " ✓

1 - " " ✓

1 - " " ✓

1 - " " ✓

1 - " " ✓

1 - " " ✓

100619

Scope of Services
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as to the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, express or implied, is made or intended by Acuren Group Inc.

SIGNATURES

CLIENT REPRESENTATIVE

Matthew Murdoch

SIGNATURE

DTR # E 63501

TECHNICIAN (SIGNATURE):

Mike Lethbridge

REPORT
REVIEWED BY:

NAME

NAME (PRINT):

CGSB LEVEL 1ST TECHNICIAN SNT LEVEL 2ND TECHNICIAN
CGSB REG. NO. 100619CGSB LEVEL _____ SNT LEVEL _____
CGSB REG. NO. _____

CLIENT COPY

CANARY - OFFICE COPY

PINK - TECHNICIAN COPY

GOLD - OFFICE COPY